

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
16 May 2002 (16.05.2002)

PCT

(10) International Publication Number
WO 02/38870 A1

(51) International Patent Classification⁷: **E01F 9/04**,
B32B 27/08, B44C 1/10, G09F 19/22

(21) International Application Number: PCT/GB01/04714

(22) International Filing Date: 25 October 2001 (25.10.2001)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0026508.2 30 October 2000 (30.10.2000) GB
0026877.1 3 November 2000 (03.11.2000) GB

(71) Applicant (*for all designated States except US*): **ROADWAY IMAGING & MARKETING LTD** [GB/GB]; Unit E, Fox Way, Trinity Business Park, Wakefield WF2 8DH (GB).

(72) Inventor; and

(75) Inventor/Applicant (*for US only*): **TOWNEND, Ian, Stuart** [GB/GB]; The Old Vicarage, 10a The Green, Woolley, Wakefield WF4 2JG (GB).

(74) Agents: **NEILL, Alastair, William** et al.; Appleyard Lees, 15 Clare Road, Halifax HX1 2HY (GB).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

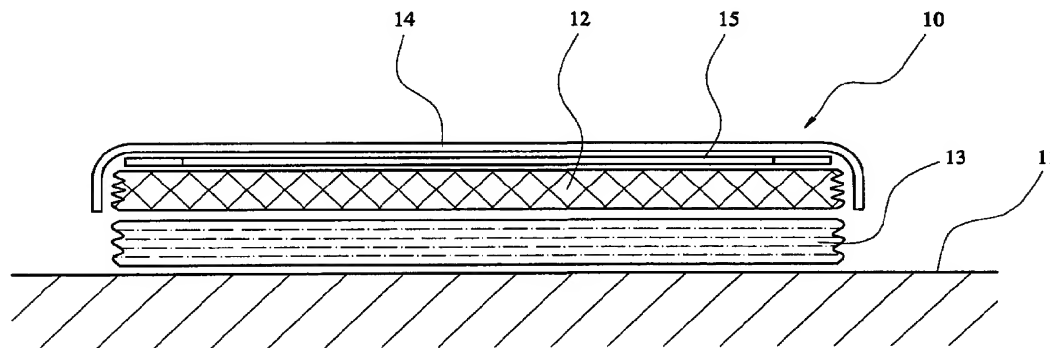
(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: FLEXIBLE DISPLAY PANEL FOR APPLICATION TO VEHICULAR OR PEDESTRIAN SURFACE



(57) Abstract: A flexible display panel (10) can be applied to a concrete or other vehicular or pedestrian support surface (11). The panel (10) is formed of a laminated assembly which comprises a fibrous backing layer (12) capable of carrying a printed image, a bituminous foundation layer (13), which adheres the display panel (10) to the concrete, and transparent wear and weather resistant top coating layer (18).



WO 02/38870 A1

**FLEXIBLE DISPLAY PANEL FOR APPLICATION
TO VEHICULAR OR PEDESTRIAN SURFACE**

This invention relates to a flexible display panel or
5 "image" for application to a vehicular or pedestrian
surface (i.e. a surface over which vehicles or pedestrians
can or may run), such as a parking surface in a vehicle
car park, or a road surface, pathway, corridor, hard
standing area, footpath; and also upright surfaces such
10 as the exposed faces of columns or walls.

It is of course well known to erect display panels
alongside the public highway, or on buildings, and also to
provide free-standing display or advertising panels on or
15 adjacent to pedestrian ways. However, the present
invention addresses specific problems encountered, when
seeking to provide a display or advertising image or panel
for application to vehicular or pedestrian surfaces.

20 Evidently, if display panels are to be applied to concrete
or other vehicular or pedestrian surfaces, such panels
will be exposed to wind and rain, and also the adverse
action of wheel-driven dust or water, de-icing salts and
cleaning compounds, and point-loading of a stiletto heel,
25 and must therefore be resistant to attack from such
sources if the panels are to have any reasonable working
life.

It is known to apply road markings e.g. road centre lines,
30 car lanes and driver instructions, such as "halt" or
"slow", but such markings are produced from thermoplastic
materials, are applied in hot form, and require
specialised equipment to apply the markings. They are

also difficult to remove, and in fact removal always leaves some surface damage.

It is also known to provide pre-formed rubber segments
5 which are mechanically or adhesively secured to road surfaces to form "traffic calming" humps, and such segments usually bear some painted markings to enhance their visibility.

10 The invention, however, has been developed primarily with a view to provide a flexible display panel or "image" which can be adhesively applied to a vehicular or pedestrian surface using simple pressure contact e.g. using a heavy roller, and which is sufficiently durable to
15 resist degradation or deterioration for an acceptable time period when exposed to ambient weather conditions, and also abrasive attack from vehicle wheels and pedestrians running over the panels, and yet retain acceptable skid values.

20

It is envisaged that the invention will be particularly attractive to owners and operators of vehicle car parks, in that there will be a captive market of car users and pedestrians which can be exposed to advertising material
25 by application of display panels to concrete, asphalt, timber or other vehicle parking and pedestrian surfaces.

In particular, the invention seeks to provide flexible display panels (images) which are sufficiently durable to
30 maintain the overall integrity of the panel for a reasonable period in situ, while at the same time maintaining an acceptable visibility of the displayed information.

According to the invention there is provided a flexible display panel (image) for application to a vehicular or pedestrian surface, said panel being formed by a laminated
5 assembly which comprises:

a fibrous backing layer which is capable of carrying a printed image in order to display any required visual material;

a foundation layer united with the backing layer and
10 constituted in such a way that the foundation can adhere the display panel to a concrete or other vehicular or pedestrian surface upon application of downward pressure to the display panel; and

a transparent wear and weather resistant top coating
15 layer applied to the upper surface of the backing layer in order to protect the backing layer while rendering visible the printed material on the backing layer.

A flexible display panel according to the invention may
20 therefore be printed with any required visual material or information on the upper surface of the fibrous backing layer, and the underlying foundation layer protects the underside of the backing layer while at the same time serving as the sole constituent of the panel which is
25 utilised to adhere the panel to a concrete or other surface.

With regard to the upper surface of the backing layer, the overlying coating layer protects the backing layer from
30 ambient weather conditions, and also renders the panel resistant to wear damage from vehicle wheels or foot traffic, but the cover layer is transparent so that the printed material remains visible.

Preferably to provide visually distinctive advertising or other material, the fibrous backing layer is capable of receiving, and holding substantially permanently, a
5 digital or printed image.

The foundation layer is preferably a bituminous layer, in the sense that it is made of, or includes bitumen, or bitumen-like material (or is adhesively based), and which
10 will preferably be treated in such a way that, in relation to prevailing ambient temperature and conditions, the foundation layer is capable of adhering to the support surface, by diffusion or otherwise, following application of downward pressure e.g. using a heavy roller, to the
15 upper surface of the panel. In addition, the panel should be able thereafter to be capable of remaining adhesively united to or with the support surface, while being exposed to ambient temperatures. In other words, different pre-treatment of the bituminous or adhesive layer will take
20 place according to the anticipated range of ambient temperatures in the intended place of use. As an alternative material for the foundation layer is any suitable adhesive material.

25 In some circumstances, it may be desirable to apply a primer to the support surface and/or to the underside of the foundation layer, to improve adhesion, where necessary, to the support surface.

30 The backing layer is preferably a woven layer of natural and/or synthetic fibres, and optionally with integration of paper compounds.

The coating layer may be made of a material which is water-resistant, and also U.V. resistant. To improve the durability of the panel, and its resistance to abrasive action from vehicle wheels, the coating layer may incorporate glass beads, clear silica beads or opalescent sand. Desirably, the coating layer is provided with reflective properties plus skid resistance.

A preferred embodiment of the flexible display panel (image) according to the invention, for application to a concrete or other vehicular or pedestrian support surface, will now be described in detail, by way of example, with reference to the accompanying schematic cross-sectional illustration.

Referring now to the drawing, a flexible display panel (image) according to the invention is designated generally by reference (10) and is illustrated schematically, and applied to a concrete or other vehicular or pedestrian support surface (11), which may be a parking surface or pedestrian access way in a vehicle car park, e.g. a multi-storey car park, a road surface hard standing area or corridor.

The panel (10) is formed of a laminated assembly which comprises a fibrous backing layer (12) which is capable of carrying a printed image, preferably a digital image, in order to display any required visual information or material. A bituminous (or adhesive) foundation layer (13) is united with the backing layer (12) and is constituted in such a way that the foundation layer (13) can adhere the display panel (10) to the concrete or other support surface (11) upon application of downward pressure

to the display panel e.g. using a heavy roller i.e. by cold-rolling.

A transparent wear and weather resistant top coating layer
5 (14) is applied to the upper surface of the backing layer (12), and also overlies and protects the printed image (15) while at the same time linking with the foundation layer (13) carried, or actually incorporated into the surface of the backing layer (12). The top coating layer
10 (14) therefore protects the backing layer and the printed image, from both weather conditions, and also from abrasive action of vehicle wheels, or pedestrian traffic running over the display panel. The coating layer also renders the printed material on the backing layer visible,
15 whilst at the same time integrating all component parts.

The foundation layer (13) is a bituminous layer, in the sense that it is made of, or includes bitumen, or bitumen derived constituents, or bitumen-like material, or
20 adhesive compounds. Also, the constituents of the foundation layer (13) will be pre-treated in such a way that, in relation to prevailing ambient temperature and conditions, the foundation layer is capable of adhering to the support surface (11), by diffusion or otherwise,
25 following application of downward pressure by a heavy roller. In addition, the panel (10) is capable thereafter of remaining adhesively united with the support surface (11), while being exposed to ambient temperatures.

30 Evidently, in colder climates, the pre-treatment of the foundation layer (13) will be different from the pre-treatment when the intended location of use of the display panel is in an environment having a warming climate.

In some circumstances, it may be desirable to apply a primer to the support surface (11) and/or to the underside of the foundation layer (13) to improve the adhesion of the display panel (10) to the support surface (10).

The backing layer (12) is a woven layer of natural and/or synthetic fibres, and optionally incorporating paper.

The coating layer (14) is made of material which is water resistant, clear and U.V. resistant. To improve durability of the panel overall, and in particular to provide improve resistance to abrasive action from vehicle wheels, the coating layer (14) may incorporate glass beads, clear silica beads, or opalescent sand.

The reader's attention is directed to all papers and documents which are filed concurrently with or previous to this specification in connection with this application and which are open to public inspection with this specification, and the contents of all such papers and documents are incorporated herein by reference.

All of the features disclosed in this specification (including any accompanying claims, abstract and drawings), and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive.

Each feature disclosed in this specification (including any accompanying claims, abstract and drawings), may be replaced by alternative features serving the same,

equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features.

5

The invention is not restricted to the details of the foregoing embodiment(s). The invention extend to any novel one, or any novel combination, of the features disclosed in this specification (including any accompanying claims,
10 abstract and drawings), or to any novel one, or any novel combination, of the steps of any method or process so disclosed.

CLAIMS:

1. A flexible display panel (image) for application to a vehicular or pedestrian surface, said panel being formed
5 by a laminated assembly which comprises:

a fibrous backing layer which is capable of carrying a printed image in order to display any required visual material;

a foundation layer united with the backing layer and
10 constituted in such a way that the foundation can adhere the display panel to a concrete or other vehicular or pedestrian surface upon application of downward pressure to the display panel; and

a transparent wear and weather resistant top coating
15 layer applied to the upper surface of the backing layer in order to protect the backing layer while rendering visible the printed material on the backing layer.

2. A flexible display panel as claimed in claim 1, in
20 which the fibrous backing layer is capable of receiving a digital printed image to provide visually distinctive advertising or other material.

3. A flexible display panel as claimed in either claim 1
25 or claim 2, in which the foundation layer is a bituminous layer.

4. A flexible display panel as claimed in claim 3, which is treated in such a way that, in relation to prevailing
30 ambient temperatures and conditions, the foundation layer is capable of adhering to the support surface.

5. A flexible display panel as claimed in claim 4, in which the foundation layer is capable of adhering to the support surface by diffusion or otherwise, following application of downward pressure to the upper surface of the panel.

6. A flexible display panel as claimed in claim 5, in which the panel is thereafter capable of remaining adhesively united to or with the support surface, while being exposed to ambient temperatures.

7. A flexible display panel as claimed in claim 3, in which the foundation layer is any suitable adhesive material.

8. A flexible display panel as claimed in any preceding claim, in which, in use, a primer is applied to the support surface and/or to the underside of the foundation layer, to improve adhesion to the support surface.

9. A flexible display panel as claimed in any preceding claim, in which the backing layer is a woven layer of natural and/or synthetic fibres.

10. A flexible display panel as claimed in claim 9, in which the backing layer includes paper compounds.

11. A flexible display panel as claimed in any preceding claim, in which the coating layer is made of a material which is water-resistant.

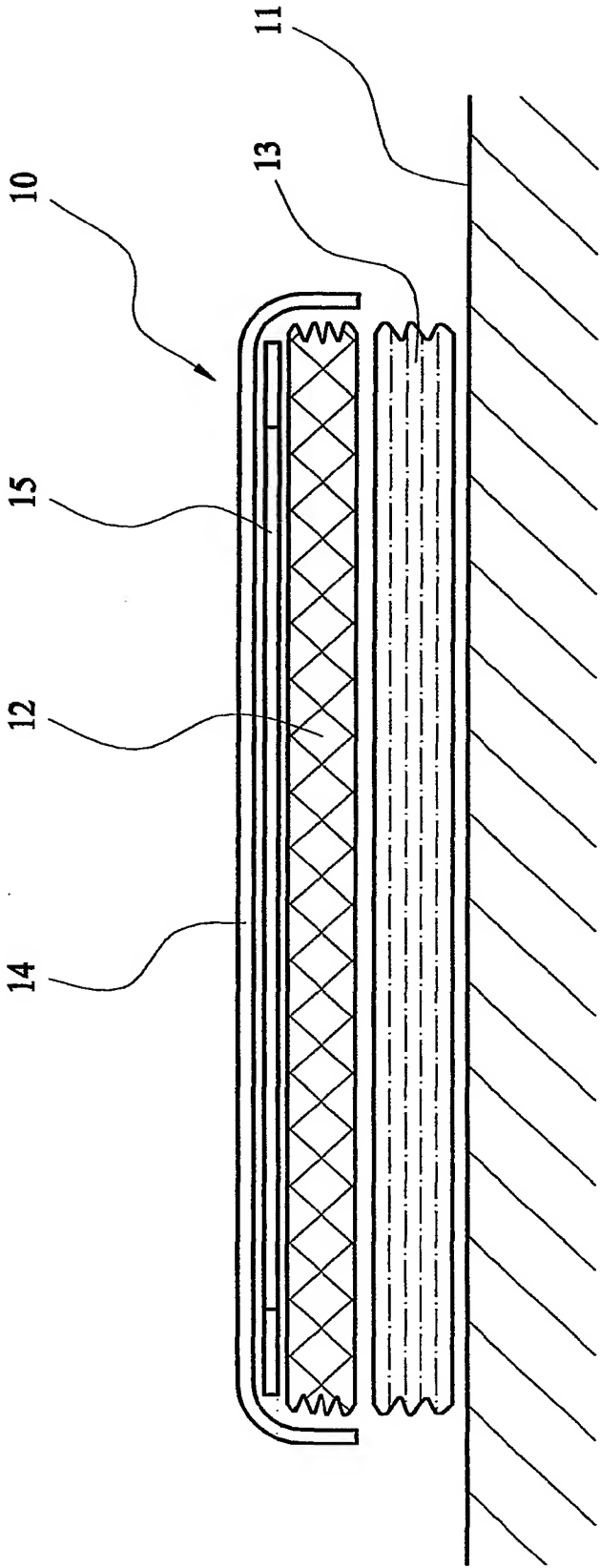
12. A flexible display panel as claimed in claim 11, in which the coating layer is U.V. resistant.

13. A flexible display panel as claimed in any preceding claim, in which the coating layer incorporates glass beads, clear silica beads or opalescent sand.

5

14. A flexible display panel as claimed in any preceding claim, in which the coating layer is provided with reflective properties, together with skid resistance.

-1/1-



INTERNATIONAL SEARCH REPORT

National Application No

PCT/GB 01/04714

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 E01F9/04 B32B27/08 B44C1/10 G09F19/22

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 E01F B32B B44C G09F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 99 44840 A (MINNESOTA MINING & MFG) 10 September 1999 (1999-09-10)	1-7, 11-14
Y	the whole document	8-10
X	WO 00 24970 A (MINNESOTA MINING & MFG) 4 May 2000 (2000-05-04)	1,2
Y	the whole document	8-10
A		4-7, 11-14
A	EP 0 037 211 A (MINNESOTA MINING & MFG) 7 October 1981 (1981-10-07) the whole document	1,2,4-7, 9,11-14
A	US 1 732 869 A (WAMBACH EUGENE F) 22 October 1929 (1929-10-22) the whole document	1-3,9
	--- -/--	



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents :

A document defining the general state of the art which is not considered to be of particular relevance

E earlier document but published on or after the international filing date

L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

O document referring to an oral disclosure, use, exhibition or other means

P document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

G document member of the same patent family

Date of the actual completion of the international search

27 February 2002

Date of mailing of the international search report

06/03/2002

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Verveer, D

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 01/04714

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB 1 116 864 A (PERMANITE LTD) 12 June 1968 (1968-06-12) page 2, line 40 - line 66 -----	1, 3-6, 13

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 01/04714

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9944840	A	10-09-1999	US 6180228 B1	30-01-2001
			AU 734211 B2	07-06-2001
			AU 2796199 A	20-09-1999
			BR 9908403 A	31-10-2000
			CN 1291944 T	18-04-2001
			EP 1060088 A1	20-12-2000
			WO 9944840 A1	10-09-1999
WO 0024970	A	04-05-2000	AU 2974099 A	15-05-2000
			WO 0024970 A1	04-05-2000
EP 0037211	A	07-10-1981	US 4299874 A	10-11-1981
			AU 537122 B2	07-06-1984
			AU 6889181 A	08-10-1981
			BR 8101890 A	06-10-1981
			CA 1142010 A1	01-03-1983
			DE 3170990 D1	25-07-1985
			EP 0037211 A1	07-10-1981
			JP 1293877 C	16-12-1985
			JP 56153003 A	26-11-1981
			JP 60017884 B	07-05-1985
US 1732869	A	22-10-1929	NONE	
GB 1116864	A	12-06-1968	NONE	